

formed near the Catholic Cemetery, about 4 miles from Erie, Pa. It moved rapidly eastward a distance of about 3 miles in a path about one-half mile wide. Eleven large trees, within a distance of 100 feet, were twisted off, leaving the stumps standing; one of the trees was 3 feet in diameter. A large cucumber tree, 95 feet high, standing alone in a field, was torn up by the roots. Fence rails were blown about like straws, and shocks of corn were carried up. The instruments at the Signal Office in Erie indicated a marked disturbance, and two special observations were taken. The clouds were low and of a gray, angry appearance, and their movement was cyclonic. The rainfall at Erie was 1.12 inch. The tornado was attended by a deep roaring sound. No lives were lost. On the 19th a heavy hail storm, with high winds, caused considerable damage in the Wyoming Valley, Pa. At Key West, Fla., a fresh se. wind began at midnight, 28th, and veered to sw. at 4 a. m., 29th, after which it began to increase in force until 9.10 a. m., when a velocity of 38 miles per hour was reached, with barometer at 29.83. At 11.25 a. m. the wind jumped to nw., and at 11.55 a. m. attained a velocity of 52 miles per hour; one mile being registered at the rate of 60 miles per hour at 11 a. m.

This was the highest velocity recorded for November at Key West since the establishment of that station in 1870. Strong nw. wind continued during the afternoon, and at midnight it was blowing 36 miles per hour. The 29th opened overcast, with cumulo-stratus clouds, which soon began to break; partly cloudy weather followed. At 11 a. m. the "norther" cloud-bank was observed approaching, and it passed over the station at 11.25 a. m. Weather cloudy and threatening throughout the afternoon, with light rain from 7.20 to 7.35 a. m., and from 8 to 8.15 p. m. As the wind veered to nw. the barometer commenced to rise rapidly, and at 8 p. m. stood at 29.97. The following casualties occurred during the storm: The s. s. "Alamo" in endeavoring to get to her wharf was forced into the U. S. Lighthouse s. s. "Laurel," which sustained damage to the extent of \$300. Smaller vessels dragged their anchors, but none were materially injured. At Jupiter, Fla., a heavy rain storm, with thunder and lightning, began at 4.50 a. m., 29th, and continued at intervals during the day. Some damage was done to crops, and oranges and other fruit suffered. Incoming steamers reported navigation very difficult owing to the high winds.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-point at the several stations; the highest and lowest water during November, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, November, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	30	14.8	14	3.8	11.0
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	20	17.1	9, 10	2.6	14.5
Little Rock, Ark.	23.0	21	19.7	8, 9, 10, 11	5.7	14.0
<i>Missouri River.</i>						
Fort Buford, N. Dak.		3	0.5	10, 14, 15, 16	0.1	0.4
Kansas City, Mo.	21.0	18	5.6	1	4.9	0.7
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.5	1.4	2.3	29, 30	1.0	1.3
La Crosse, Wis.	13.0	1	4.3	30	2.9	1.4
Dubuque, Iowa.	16.0	1	5.8	22, 28, 29, 30	3.7	2.1
Davenport, Iowa.	15.0	1	4.2	30	2.4	1.8
Keokuk, Iowa.	14.0	1	4.5	29, 30	2.2	2.3
Saint Louis, Mo.	32.0	23, 24	8.9	13, 14, 15, 16	6.3	2.6
Cairo, Ill.	40.0	25	24.3	15	14.1	10.2
Memphis, Tenn.	34.6	27	18.5	16	11.2	7.3
Vicksburg, Miss.	41.0	30	26.6	1	16.4	10.2
New Orleans, La.	13.0	30	7.9	1	4.8	3.1
<i>Ohio River.</i>						
Pittsburgh, Pa.	22.0	19	12.8	29, 30	4.2	8.6
Parkersburg, W. Va.	38.0	21	18.7	30	7.4	11.3
Cincinnati, Ohio.	50.0	19, 20	31.5	12	16.5	15.0
Louisville, Ky.	25.0	19, 20	12.5	12, 30	8.2	4.3
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	21	11.4	15	3.2	8.2

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	1	6.8	30	2.4	4.4
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29.0	19	12.8	29, 30	4.2	8.6
<i>Savannah River.</i>						
Augusta, Ga.	32.0	1	8.2	25, 26	6.8	1.4
<i>Willamette River.</i>						
Portland, Oregon.	15.0	17	2.4	7	0.5	2.9

ICE IN RIVERS AND HARBOES.

Mississippi River.—Red Wing, Minn., 10th, thin ice, the first of the season, covered the river. Saint Paul, Minn., 9th, small pieces of floating ice in the river.

Missouri River.—Fort Buford, N. Dak., 9th to 14th, floating ice in the river. Scranton, S. Dak., 8th, anchor ice in the river. Fort Sully, S. Dak., 10th, running ice in the river; navigation closed on 11th.

At Duluth, Minn., thin ice formed on the Superior side of the Bay on the 8th. On the 27th and 28th ice interrupted navigation on the Erie Canal in east-central New York.

FLOODS.

Floods and high water were reported along the Gila and Colorado rivers in west Arizona on the 8th.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 1st, Mount Saint Mary's, Md. 2d, Fort Buford, N. Dak. 3d, La Fayette, Ind. 5th, Mount Saint Mary's, Md. 6th, Huron, S. Dak.; Mount Saint Mary's, Md.; Meadville, Pa. 7th, New Hartford, Conn.; Alta, Bancroft, Cresco, Osage, and Stilson, Iowa; Barren Creek Springs and Mount Saint Mary's, Md.; Amherst, Cambridge, Concord, Dudley, Leicester, North Billerica, and Somers, Mass.; Red Wing, Saint Paul, Saint Vincent, and Sheldon, Minn.; Chateau and Fort Assiniboine, Mont.; Kennedy and North Loup, Nebr.; Antrim and Nashua, N. H.; Egg Harbor City, Madison, Rancocas, and Readington, N. J.; New Lisbon, N. Y.; Bismarck, Fort Buford, Fort Yates, and New England City, N. Dak.; Eagle's Mere, Le Roy, and

Westtown, Pa.; Block Island, R. I.; Scranton and Webster, S. Dak.; Embarrass, Green Bay, and Peshtigo, Wis. 13th, Voluntown, Conn.; Eastport Me.; Amherst, Mass.; Alpena and Thornville, Mich.; Palermo, N. Y.; Eagle's Mere and Le Roy, Pa.; Block Island, R. I.; Huron, S. Dak.; Northfield, Vt.; Grantsburgh, Wis. 14th, Saint Vincent, Minn.; Rondout, N. Y. 15th, Fort Buford, N. Dak. 16th, Webster, S. Dak. 19th, Mount Saint Mary's, Md. 21st, Austin, Mo. 25th, 26th, and 29th, Mount Saint Mary's, Md.

On the 7th auroras were observed in the Atlantic coast states from New Hampshire to Maryland, and in Wisconsin, Minnesota, Iowa, Nebraska, the Dakotas, and Montana.

Fort Buford, N. Dak., 2d: an aurora was observed at 12.31 a. m., consisting of streamers rising from altitude about 15°